Figures for Patent Application: *Optical Structures Employing Semicontinuous Metal Films*

Fig. 1 is an electron microscopy image (400×500 nm) of a semicontinuous metal film near percolation.

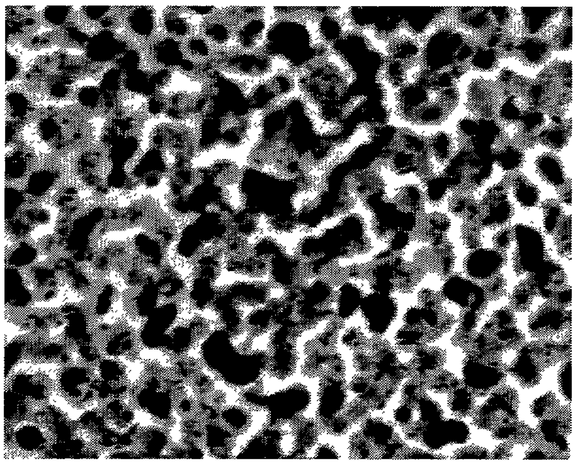


Fig. 2 is a near-field optical image (5×5 μm) of a semicontinuous metal film near the percolation threshold; the white areas have much greater local light intensity than the dark areas.

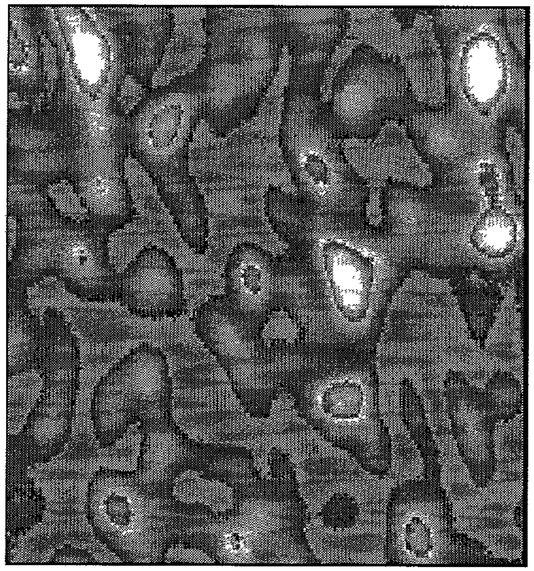


Fig. 3 is a schematic representation of an optical sensor employing a semicontinuous metal film. One or more detectors could be used.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
12, a light source;
14, a detector located at the same side of the light source;
16, an alternative detector located at the opposite side of the light source; and
18, additional layer(s) for structural support and other purposes.

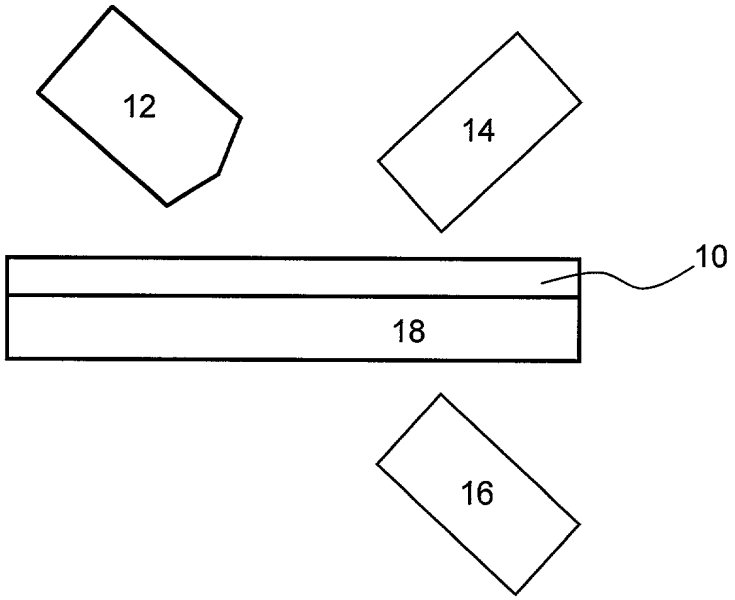


Fig. 4 is a schematic representation of a gratingless spectrometer employing a semicontinuous metal film. One or more near-field detectors could be used.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
12, a light source;
18, additional layer or layers for structural support and other purposes;
24, a near-field detector located at the same side of the light source; and
26, an alternative near-field detector located at the opposite side of the light source.

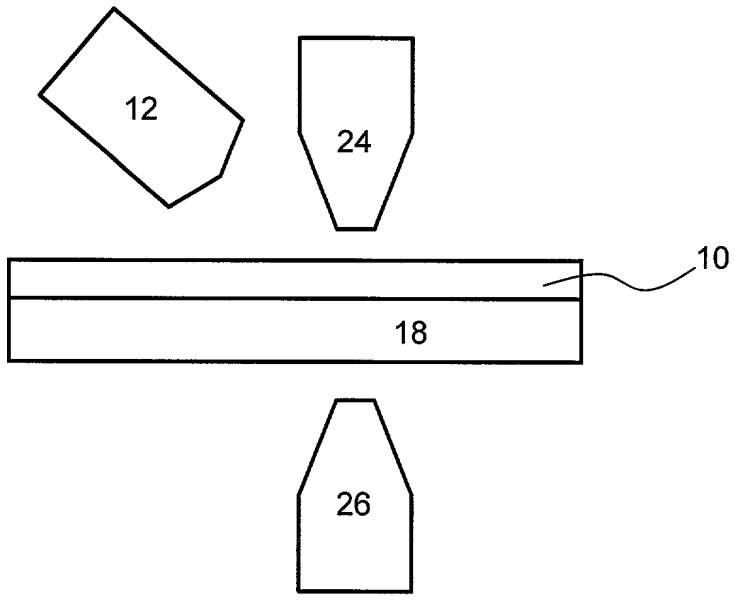


Fig. 5 is a schematic representation of a device for cryptography, coding and decoding information employing a semicontinuous metal film. One or more near-field detectors could be used.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
12, a light source;
18, additional layer(s) for structural support and other purposes;
24, a near-field detector located at the same side of the light source;
26, an alternative near-field detector located at the opposite side of the light source; and
32, a computerized logic component that compares a detected light pattern with an expected pattern.

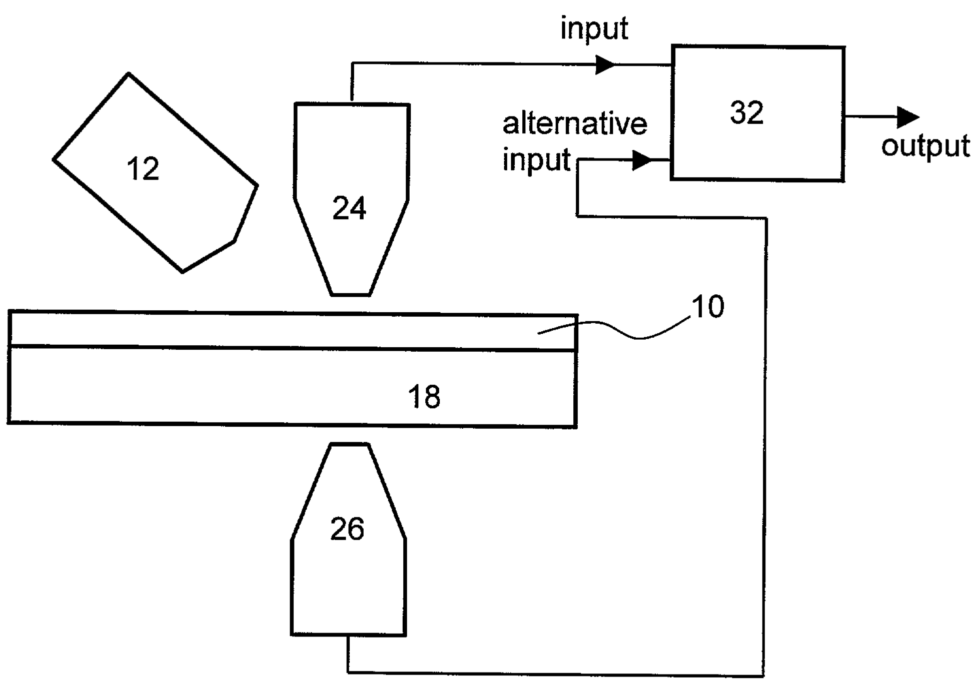


Fig. 6 is a schematic representation of an enhanced optical limiting device employing a semicontinuous metal film.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
18, additional layer(s) for structural support and other purposes; and
42, a layer of optical limiting materials.

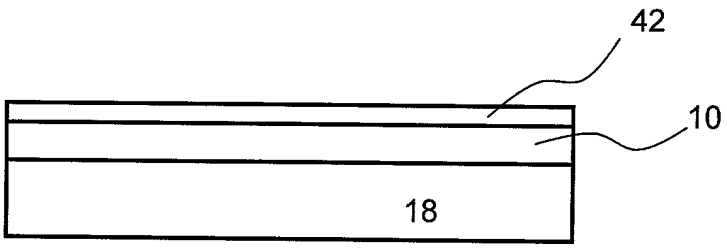
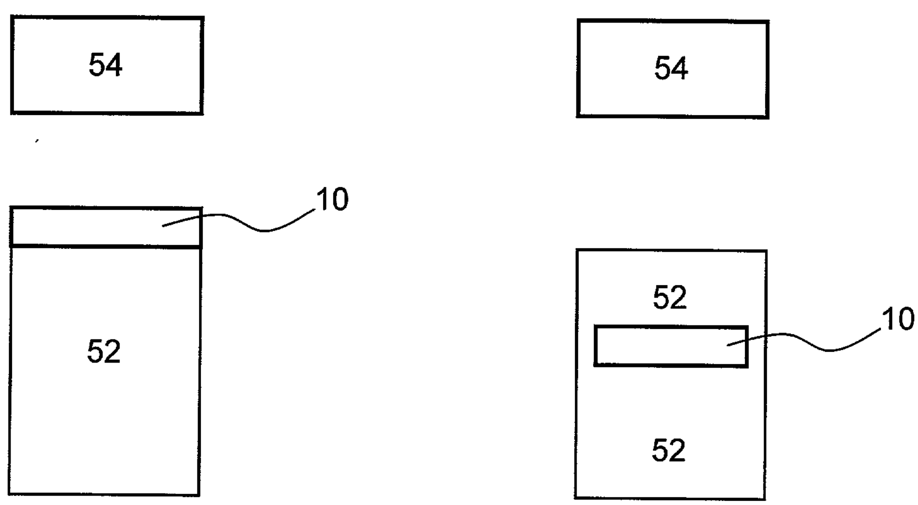


Fig. 7 is a schematic representation of a microlaser employing a semicontinuous metal film. The film can be either (A) located at the surface of a microcavity or (B) integrated together with the microcavity. There should also be an active medium (not shown in the figure), which could stand alone, or integrated together with either the semicontinuous metal film or microcavity. The energy source could be either optical or electrical.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
54, an energy source; and
52, a microcavity.



(A) (B)

Fig. 8 is a schematic representation of an optical amplifier employing a semicontinuous metal film. The amplifier (A) may or (B) may not have an additional coating layer of optical materials such as Raman materials. The output is amplified.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
12, a light source;
18, additional layer(s) for structural support and other purposes; and
62, a layer of optical materials such as Raman materials.

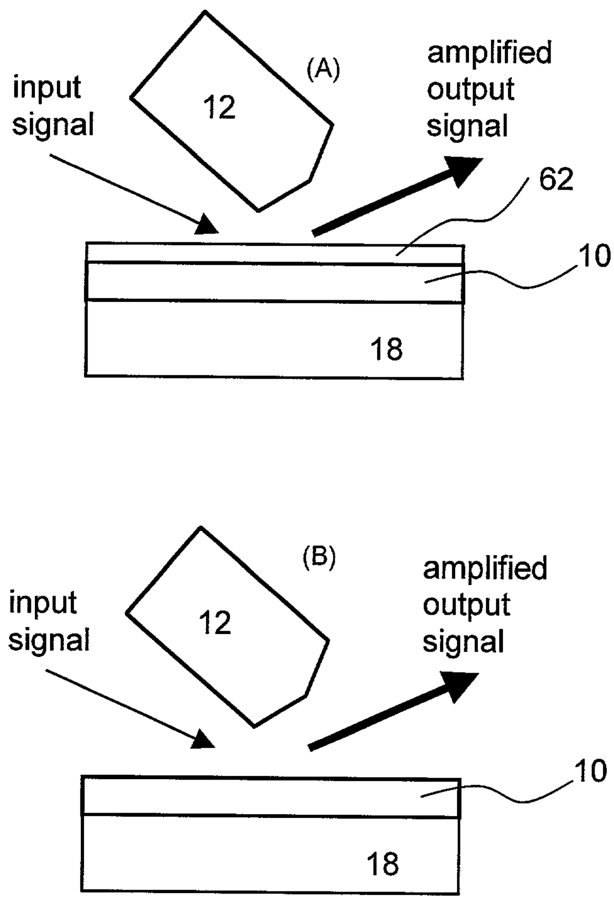


Fig. 9 is a schematic representation of an optical switch employing a semicontinuous metal film. The switch (A) may or (B) may not have an additional coating layer of optical materials such as Kerr materials. The input and output are at different wavelengths.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
12, a light source;
18, additional layer(s) for structural support and other purposes; and
64, a layer of optical materials such as Kerr materials.

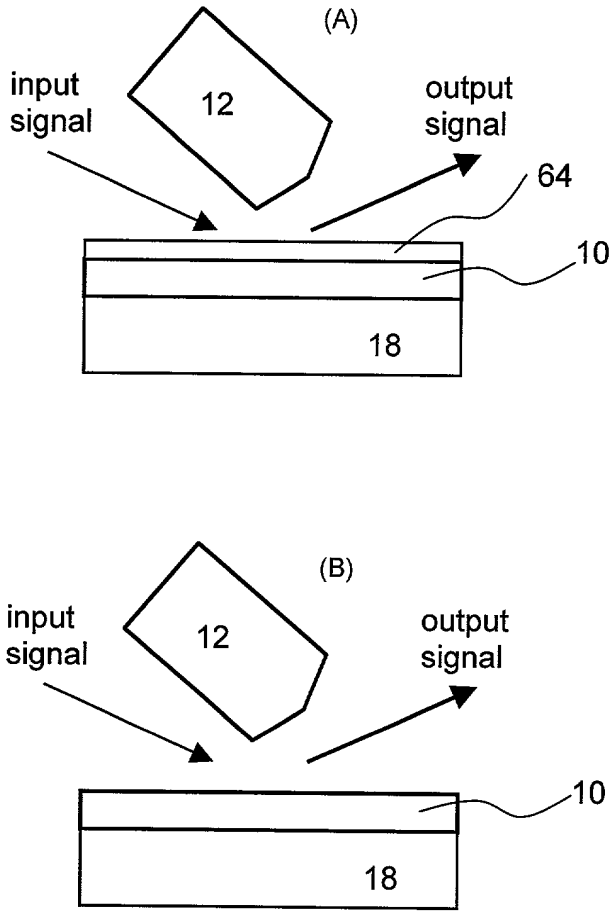


Fig. 10 is a schematic representation of a super-density optical recording device employing a semicontinuous metal film. One or more near-field detectors could be used.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
12, a light source;
18, additional layer(s) for structural support and other purposes;
24, a near-field detector located at the same side of the light source;
26, an alternative near-field detector located at the opposite side of the light source; and
66, a layer of photosensitive materials.

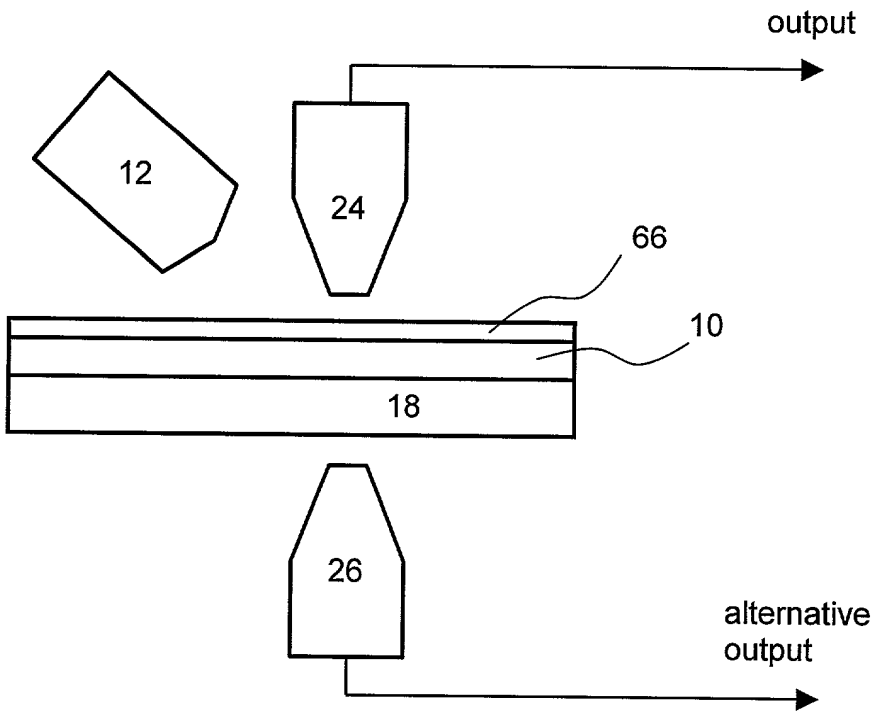


Fig. 11 is a schematic representation of a photochemical enhanced device employing a semicontinuous metal film.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
18, additional layer(s) for structural support and other purposes; and
72, a photochemical agent.

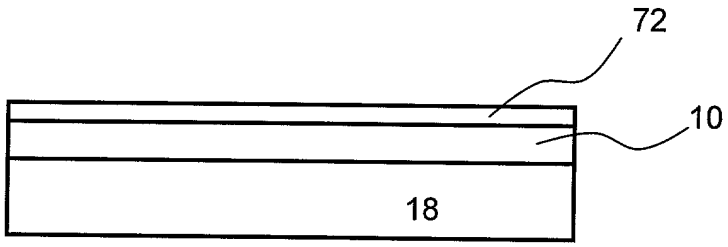


Fig. 12 is a schematic representation of a photobiological enhanced device employing a semicontinuous metal film.

10, a medium comprising a semicontinuous metal film of randomly distributed metal particles and their clusters;
18, additional layer(s) for structural support and other purposes; and
82, a photobiological agent.

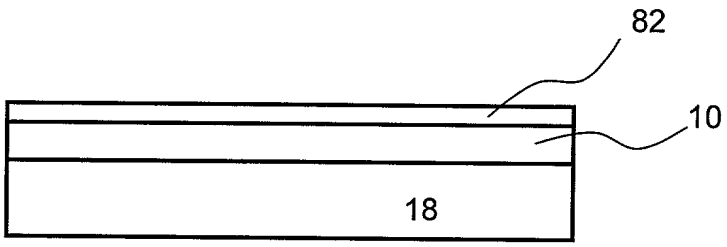


Fig. 13 is a schematic representation of a sub-femtosecond pulse generation device employing a semicontinuous metal film.